PRESS BULLETIN 524 *December, 1938*

UNIVERSITY OF FLORIDA
AGRICULTURAL EXPERIMENT STATION
WILMON NEWELL, Director
GAINESVILLE

IMPERIAL MYCOLOGICAL INSTITUTE
8 AUG. 1939

BLOSSOM-END ROT OF TOMATOES

By GEORGE F. WEBER
Plant Pathologist, Florida Agricultural Experiment Station

Blossom-end rot of tomatoes, also spoken of as point rot, black rot, blight and dry rot, occurs in Florida wherever tomatoes are commercially grown. It is common in the tomato-producing areas of the United States and most of the important countries of the world. In the Southeastern and Gulf states it occurs annually to a great extent. The damage it causes is manifest in direct loss of fruit. Fields have been observed that showed 80 percent loss of fruit on large healthy-looking plants. Most tomato fields in Florida show some loss from this trouble and a 3 to 4 percent annual loss is a conservative estimate. It is usually more serious on plants that are pruned and staked than on unpruned and unstaked plants.

This disease may occur on plants on a specific piece of land one season and not appear the next. However, it frequently develops in certain fields or parts of fields every year at certain stages of growth of the plants.

Blossom-end rot is confined to tomatoes, although a similar condition is common on peppers. There is considerable variation among tomato species and commercial varieties in susceptibility to the trouble. It has not been observed on the small cherry or pear types, while large commercial varieties in parallel rows have had considerable rotted fruit. A certain variety of tomatoes may not show any of the disease in one locality, while in another it may be severely affected. Other factors being equal, the varieties producing shorter, more compact type of vine growth usually show less blossom-end rot than rank growing, highly vegetative varieties.

Clusters of fruit are produced on tomato plants consecutively over a period of from four to six weeks, and conditions causing blossom-end rot may change rapidly enough to cause the disease to appear on only one or two of the several clusters. The first and second clusters are more often free from the disease than those following.

Most tomato growers are familiar with the disease as it appears in the field. The appearance of small, more or less water-soaked areas resembling bruises, on the blossom-end half of the green fruits, constitutes the first definite symptom of the trouble. This area develops rapidly in intensity and size until from one-fourth to one-half of the outer surface of the fruit is involved. As the maximum size is approached, the affected area appears tough and leathery, discolored, varying from a bleached yellow to greenish-black, and depressed. Fruits frequently show the disease when they are from one-half to three-quarters inch in diameter, although it occurs in much larger fruits. Fruits affected when small may shrink very little, while the larger fruits show considerable shrinkage and

collapse of the affected tissue, causing them to become flattened. The diseased tissue may become dry and smooth, eventually crack and disintegrate, but more often the surface becomes overgrown with numerous saprophytic organisms, particularly fungous molds. Affected half-grown fruits are lighter green in color around the stem end than healthy ones and can be readily detected on the vines in the field when the diseased portion is not easily observed. Slightly affected fruits usually become colored, approximating ripeness, earlier than healthy fruit.

Unfavorable moisture relationships are considered the cause of blossom-end rot. Experiments have shown that no parasitic organism is capable of producing the disease, although many organisms grow on the affected parts of fruits. Consequently, it is not contagious and no fungicide or insecticide applied as spray or dust will in any way function in controlling it. On the other hand, variations in soil moisture and certain fertilizers under controlled conditions have produced symptoms of the disease comparable to that condition found on plants in the field. A sudden reduced or excessive supply of water will produce the disease within four to six days. By controlling the water supply in experiments it has been possible to produce the first two clusters of healthy fruit, the third and fourth clusters showing blossom-end rot and the fifth and sixth clusters healthy fruit.

For best growth and production of fruit, tomato plants require a continuous supply of soil moisture. When the supply is reduced or increased for any reason, the plant is affected. When this reduction is extensive enough that the foliage cannot obtain the required amount, moisture is removed from the fruits. This removal occurs first in the blossom end of the fruit and it is thought that such reduction in water results in a greater concentration of salts and acids which are injurious to the plant cells in that area. Any sudden changes of moisture or temperature that cause the moisture demand of the plant to exceed the supply may result in the production of the disease. In the time between production of the first and fourth fruit clusters the plant more than doubles in top growth and consequently requires more water. If normal development of the root system is prevented by hardpan, rock, high water table or by pruning due to too close cultivation, the roots will be inadequate to obtain sufficient water for the top during sudden, hot, dry periods after excessive pruning or the application of bordeaux spray. This deficiency in water supply will result in the development of blossom-end rot. Plants are most susceptible to the disease during the period of their greatest activity. In almost every instance where the disease has occurred it can be attributed to fluctuating and unbalanced soil water conditions.

Control of blossom-end rot of tomatoes in view of the above information resolves itself into better cultural practices, especially in regard to the water supply of the plants. The ideal growing medium where temperature conditions are as variable as in Florida is a well drained soil with plenty of available water. Beware of a high water table or dry, rocky land because they limit the extent of the root system. Sudden flooding or drought usually results in the development of the disease. Bordeaux spray increases the demand for water by the plant and may be sufficient to cause the disease in plants close to a balance. Staking and pruning exposes more of the leaf surface area to drying conditions, thereby increasing the rate of evaporation and may cause blossom-end rot. Since there may be one or more contributing factors in the development of blossom-end rot, each field where it occurs must be considered separately.